Remarks/Arguments:

Claims 1-16 are pending in the application.

Rejections under 35 U.S.C. §103

Claims 1-3 and 6-16 stand rejected as unpatentable over WO Publication No. 02/25764 ("McGrath"). Claims 1-8, 13, and 14 stand rejected as unpatentable over EP Patent No. 0008894 ("Rose"). Claims 1-10 and 13-16 stand rejected as unpatentable over U.S. Patent Application No. 2002/0187377 ("Shinoda"). Applicants traverse these rejections and submit that the pending claims are patentable over these cited references for at least the reasons set forth below.

"To establish a *prima facie* case of obviousness, ... the prior art reference (or references when combined) must teach or suggest all the claim limitations." M.P.E.P. §2143. Additionally, as set forth by the Supreme Court in KSR Int'l Co. v. Teleflex, Inc., 82 U.S.P.Q.2d 1385 (2007), it is necessary to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the prior art elements in the manner claimed.

Rejection of Claims 1-3 and 6-16

Claim 1 recites:

A polymer wherein at least 80% of the repeat units comprise
a) **an ion-conducting region** having an aromatic backbone of at least one aromatic group, wherein at least one ion-conducting functional group is attached to each aromatic group; and
b) **a spacer region** having an aromatic backbone of at least four aromatic groups, wherein no ion-conducting functional groups are attached to the aromatic backbone,
such that **at least 80% of the polymer chain contains alternate ion-conducting and spacer regions along the length of the chain.**

Applicants respectfully submit that claim 1 is allowable at least because McGrath is lacking at least 80% of the polymer chain containing alternate (also understood as alternating) ion-conducting and spacer regions along the length of the chain.

The claimed invention recites a polymer wherein at least 80% of the repeating units comprise an ion-conducting region and a spacer region. Thus, alternating ion-conducting regions and spacer regions make up at least 80% of the polymer. The polymer can therefore be

considered to be an alternating polymer comprising alternating units of ion-conducting regions (unit A) and spacer region (unit B). Polymers can be classified into a number of different classes depending on the arrangement of their structural units:

Alternating copolymers: have regular alternating A and B units

- A –B –A –B –A –B – etc.

Random copolymers: have random sequences of A and B units

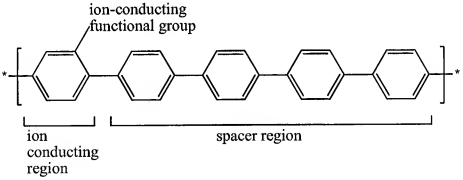
- A – B – B – B – A – B – A – B – A – A - etc.

Block copolymers: have blocks of units of the same type

- A – A – A – A – A – B – B – B – B – B- etc.

Cross-linking polymers: In addition to the bonds which hold monomers together in a polymer chain, many polymers form bonds between neighbouring chains and therefore neighbouring chains are linked together.

As previously discussed, claim 1 recites at least 80% of the repeat units of the polymer chain contains alternate ion-conducting (e.g., unit A) and spacer regions (e.g., unit B) along the length of the chain. These ion-conducting regions and non-ion-conducting (spacer regions) alternate in strict fashion. Therefore, at its simplest level, the polymer is formed from a repeat unit of the following formula:



The Office Action states McGrath "does not teach embodiments of the polymer being used as an electrocatalyst layer or used in a membrane electrode assembly." Office Action page 2. In addition to the lack of these limitations, McGrath also fails to disclose at least an

alternating polymer as claimed. The Office Action relies upon the second figure shown on page 3 in McGrath, but the polymer shown is not an alternating polymer, but a random polymer. Thus, the sulphonated sections and unsulphonated sections are randomly arranged and several sulphonated sections may be adjacent to each other; likewise, several unsulphonated sections may be adjacent to each other. The polymer formed would **not** comprise alternating sulphonated and unsulphonated sections. The alternating polymer of the claimed invention is not disclosed in McGrath, and, contrary to the Office Action, taking the polymer disclosed on page 3 of McGrath and utilizing it in an electrocatalyst or a membrane electrode assembly would not produce the product of the claimed invention. For at least the foregoing reasons, it is respectfully submitted that independent claim 1 is in condition for allowance. Claims 2-16 depend from claim 1 and therefore should each be allowed for at least the reasons set forth above.

Rejection of Claims 1-8, 13 and 14

Applicants respectfully submit that claim 1 is allowable at least because Rose is lacking at least 80% of the repeat units of the polymer chain contains alternate ion-conducting and spacer regions along the length of the chain. Rose does not remedy the defects of McGrath discussed above. The Office Action fails to appreciate that the polymers disclosed in Rose would be random polymers and not the alternating polymers required by the claimed invention. As described in the specification, for example at pg. 2, para. 0011:

> The polymer according to the invention is made up of repeat units wherein at least 80%, suitably at least 95% and preferably all of the repeat units comprise an ion-conducting region and a spacer region. Statistical copolymers made up of ion-conducting repeat units and non-conducting repeat units are known. **Such a copolymer would have an irregular distribution of ion-conducting regions and non-conducting regions along the length of the polymer chain.** In the polymer according to the invention, at least 80% of the repeat units in the polymer contain an ion-conducting region and a spacer region that is non-conducting. Therefore, most of the polymer chain contains alternate ion-conducting and spacer regions along the length of the chain. **The spacing and frequency of the ion-conducting regions and the spacer regions is considerably more regular than in a statistical copolymer.**
>
> Present Application U.S. Pub. No. 2007/019734 (emphasis added).

Rose does not disclose the alternating polymers claimed in claim 1. Furthermore, there is no suggestion or teaching in Rose of using the alternating polymers of the claimed invention. Thus, it is respectfully submitted that independent claim 1 is in condition for allowance. Claims 2-16 depend from claim 1 and therefore should each be allowed for at least the reasons set forth above.

Rejection of Claims 1-10 and 13-16

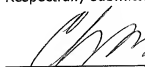
Applicants respectfully submit that claim 1 is allowable at least because Shinoda is lacking ion conducting regions and is lacking the polymer chain containing alternate ion-conducting and spacer regions along the length of the chain. The Office Action again fails to appreciate that the polymers of the claimed invention are quite specific alternating polymers. Examples 1, 4 and 5 of Shinoda reference alternating polymers, but they do not contain ion-conducting regions. Example 1 of Shinoda is a copolymer of what they refer to as BSI 1 and biphenol; Example 4 of Shinoda is a copolymer of what they refer to as BSI 2 and hydroquinone; and Example 5 of Shinoda is a copolymer BSI 2 and 4,4'-dihydroxy-3,3'-diphenylbiphenyl. None of these ionomer units has an ion-conducting region as required by the claimed invention, and therefore, there is no disclosure of or teaching towards a polymer having alternating ion-conducting and spacer regions.

As none of the references, alone or in any reasonable combination, teaches each of the claimed limitations, a *prima face* case of obviousness has not been shown. In particular, claim 1 recites at least 80% of the polymer chain contains alternate ion-conducting and spacer regions along the length of the chain. It is respectfully submitted that independent claim 1 is in condition for allowance. Claims 2-16 depend from claim 1 and therefore should each be allowed for at least the reasons set forth above.

Conclusion

For all of the foregoing reasons, Applicants respectfully request reconsideration and allowance of the claims. Applicants invite the Examiner to contact their undersigned representative if it appears that this may expedite examination.

Respectfully submitted,



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